

EIGHT NEW *LEPTAGRION* LARVAE FROM BRAZIL (ZYGOPTERA: COENAGRIONIDAE)

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The ultimate instar larvae of *L. andromache* Hag., *L. bocainense* Santos, *L. capixabae* Santos, *L. dardanoi* Santos, *L. elongatum* Sel., *L. macrurum* (Burm.), *L. perlongum* Calv. and *L. vriesianum* Santos are described and illustrated from the states of Rio de Janeiro, Espírito Santo, Minas Gerais, Pernambuco, and Santa Catarina. All specimens are deposited in Museu Nacional, Rio de Janeiro, Brazil. A comparative tab. of the structural characters is included.

INTRODUCTION

Leptagrion Selys, 1876 is an endemic genus from South America, extending from Venezuela to Argentina. It comprises 16 species of which only two: *L. croceum* (Burmeister, 1839) and *L. prothoracicum*, Kimmins, 1945 are not known from Brazil (COSTA & GARRISON, 2001; LENCIONI, 2006).

Here, the larvae or exuviae of eight species are described and illustrated. The following diagnostic characters were used: (1) ligula; (2) number of setae on rear of head; (3) number of setae on inferior border of eyes near maxillae; (4) number of setae on lateral margin of prementum; (5) palpal setae; (6) premental setae; (7) mandibular formula (WATSON 1956); (8) cerci; (9) gonapophyses; and (10) measurements (Tab. I).

MATERIAL AND METHODS

We reared 42 males and 1 female collected in terrestrial (*Canistrum*) and epiphytic bromeliads (*Neoregelia* and *Vriesia*) from different states of Brazil. All illustrations were made using a Wild M8 stereomicroscope coupled with a camera lucida. All measurements are averages given in millimeters.

Total length and abdominal length excludes appendages. All specimens examined are deposited in the collection of Museu Nacional (MN/UFRJ), Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil.

LEPTAGRION ANDROMACHE HAGEN in SELYS, 1876

Figures 1-11

Material. – Ultimate larval instar: BRAZIL, Rio de Janeiro, Arraial do Cabo, Ponta do Atalaia, 24-X-1973, (emerged 23-X-1973), N.D. Santos leg., 1♂; Ponta Negra, 24-XI-1973, (emerged: 6-XII-1973), N.D. Santos leg. 1♂; Araruama, 23-XI-1973, (emerged: 5-I-1974), N.D. Santos leg., 1♂; Recreio dos Bandeirantes (Morro do Rangel), 21-VIII-1980, (emerged: 13-X-1980), N.D. Santos, L.F.R. Netto and H. Mesquita leg., 1♂; Pedra de Itaúna, 15-XI-1980, (emerged: 27-XI-1980), N.D. Santos, L.F.R. Netto and H. Mesquita leg., 2♂; Itacuruçá, Ilha da Marambaia (Areal Bravo Meio), J.M. Costa and B.B. Oldrini leg., 1♂, 16-IX-2004, G.B.B. Silva leg., (emerged: 4-X-2004), 1♂; Itacuruçá, Ilha da Marambaia, (Areal Bravo Meio), 23-X-2006, G.L. Almeida leg., (emerged: 12-XI-2006), 1♂.

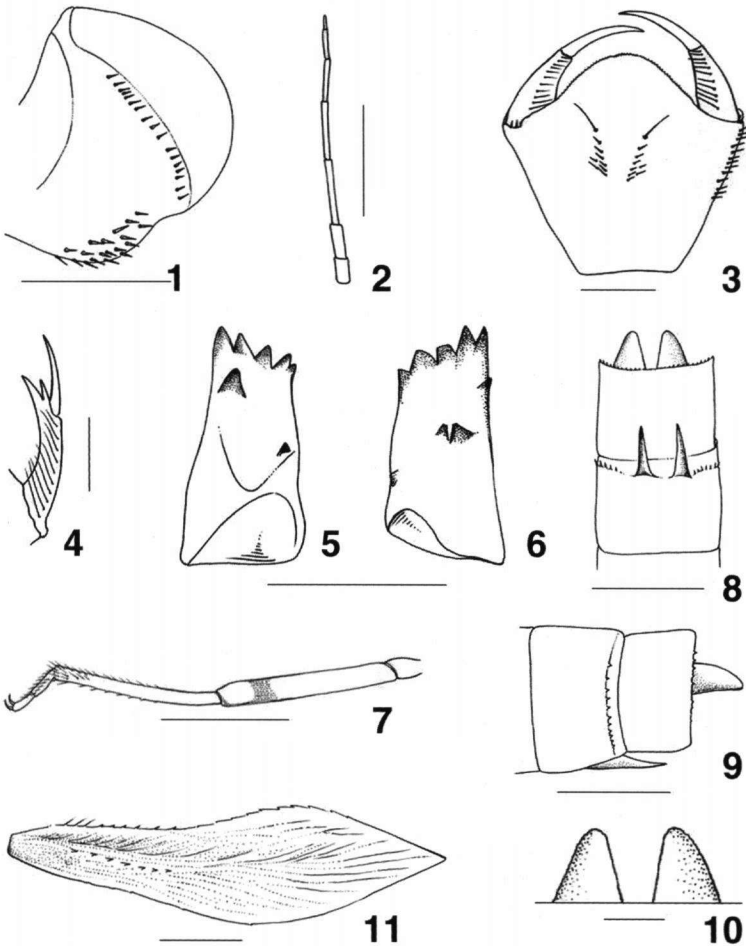
DESCRIPTION. – Male. Overall colour pale yellow, except for the caudal lamellae, these dark brown.

Head. – Wider than long, occiput concave; cephalic lobes rounded, with narrow cleft in ventral view; more than 15 short setae on rear of head; 17-18 short setae on inferior border of eyes near maxillae (Fig. 1). Antennae 7-segmented, the 3rd segment twice longer than the 2nd and slightly longer than the 4th (Fig. 2). Labium short; prementum subquadrangular (Fig. 3) with one primary setae and 8-9 secondary setae; ligula slightly prominent, finely crenulated along margin; lateral border of prementum with 12 or 13 spiniform setae (Fig. 3); labial palp with 11-12 setae (Fig. 3), anterior border with 2 teeth on distal end (Fig. 4), the external one short with distal end slightly pointed, proximal to movable hook and the inner side wide pointed; inferior border of labial palp smooth. Labrum semicircular with short setae on distal margin. Inferior border of articulation of labial palp with prementum bearing 2 spines (Figs 3-4). Articulation of pre- and postmentum situated between first pair of coxae. Mandibles (Figs 5-6) with following formula: L11'234 y ab/R11'234 y k.

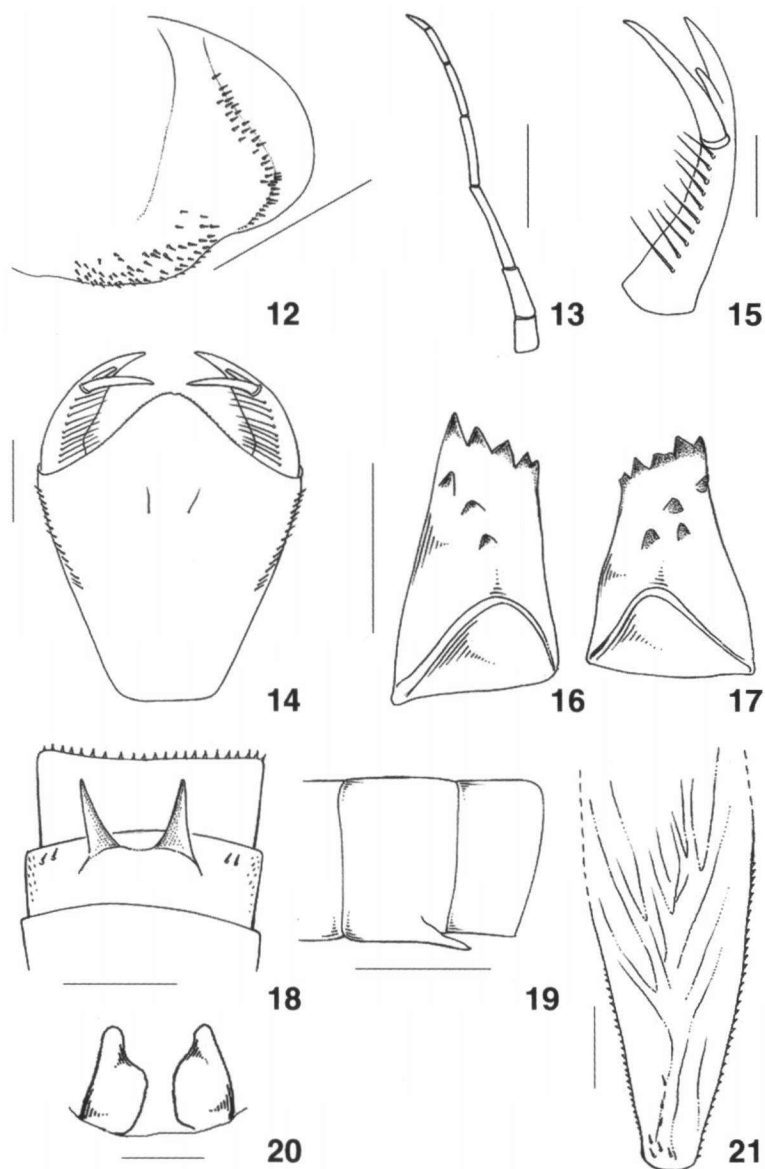
Thorax. – Pronotum quadrangular; pro-meso-metathorax with one black spot on each side. Legs short, slender and with short spines; femora with one dark band visible on distal end (Fig. 7); tibiae and tarsi lacking dark bands; claws simple. Wing pads reaching posterior margin of abdominal segment 3.

Abdomen. – Cylindrical. Dorsum of segments with short setae; distal border of segment 10 with row of short spine interrupted dorsally. Gonapophyses triangular and not denticulate (Fig. 8). Cerci short, approximately conical (Figs 8-10) and 2/3 of segment 10 in lateral view. Caudal lamellae (Fig. 11) dark brown, foliate, lacking transverse suture and uniformly pigmented; lateral and dorsal carinae of caudal lamellae with short spines on proximal half, narrow at distal half; principal tracheae almost straight; secondary tracheae barely visible.

Measurements (mm). – Total length: 18; width of head: 4; length of head: 2,5; length of prementum: 3; width of prementum: 3; antennae segments 1: 0,21, 2: 0,40, 3: 0,80, 4: 0,61, 5: 0,40, 6: 0,38, 7: 0,2; length of median caudal lamella 5,5; width of median caudal lamella: 2,0; width of lateral caudal lamellae 2,0; length of lateral caudal lamellae 6; femur I: 2; femur II: 3; femur III: 4; abdomen: 12.



Figs 1-11. *Leptagrion andromache* Hagen in Selys: (1) head, ventral view; – (2) right antenna; – (3) prementum, dorsal view; – (4) labial palp, dorsolateral view; – (5) right mandible, inner view; – (6) left mandible, inner view; – (7) posterior leg; – (8) male abdominal segment 9-10, ventral view; – (9) male abdominal segment 9-10, lateral view; – (10) male cerci, dorsal view; – (11) lateral caudal lamella.



Figs 12-21. *Leptagrion bocainense* Santos: (12) head, ventral view; – (13) right antenna; – (14) prementum, dorsal view; – (15) labial palp, dorsolateral view; – (16) right mandible, inner view; – (17) left mandible, inner view; – (18) male abdominal segment 9-10, ventral view; – (19) male abdominal segment 9-10, lateral view; – (20) male cerci, dorsal view; – (21) lateral caudal lamella.

LEPTAGRION BOCAINENSE SANTOS, 1979

Figures 12-21

M a t e r i a l. – Ultimate larval instar: BRAZIL, Minas Gerais, Parque Estadual do Ibitipoca, (emerged on 14-VII-1981), A.B.M. Machado leg., 1 ♂.

DESCRIPTION. – Pale yellow except for the (incomplete) caudal lamellae which are light brown.

H e a d. – Wider than long, occiput slightly concave; cephalic lobes rounded, with narrow cleft in ventral view; more than 30 short spines on rear of head; 23 short spines on inferior border of eyes near maxillae (Fig. 12). Antennae 7-segmented, 3rd segment twice as long as 2nd segment and longer than 4th (Fig. 13). Labium short; prementum triangular with one primary setae and one secondary setae; ligula strongly prominent, finely crenulated along margin; lateral border of prementum with 17-18 spiniform setae (Fig. 14); labial palp with 10-11 setae (Figs 14-15); anterior border with 2 teeth on distal end, being the external one, proximal to movable hook, short with distal end slightly truncate (Figs 14-15) and the inner one wide and pointed; inferior border of labial palp smooth. Labrum slightly semicircular with short setae on distal margin. Inferior border of articulation of labial palp with prementum bearing 2 spines (Fig. 14). Articulation of pre-and postmentum situated between first pair of coxae. Mandibles (Figs 16-17) with following formula: L12344 y abd/ R11'234y bd.

T h o r a x. – Broken (impossible to describe it).

A b d o m e n. – Broken and incomplete. Gonapophyses triangular, short and smooth (Figs 18-19), surpassing half of length of segment 10 in ventral view. Cerci in dorsal view almost globe-shaped (Fig. 20), 2/3 of length of segment 10. Caudal lamellae incomplete (Fig. 21), dark brown, foliate, without transverse suture and uniformly pigmented; lateral and dorsal carinae of caudal lamellae with short spines.

M e a s u r e m e n t s (mm). – Total length: 18; prementum length: 5; prementum max. width: 4.

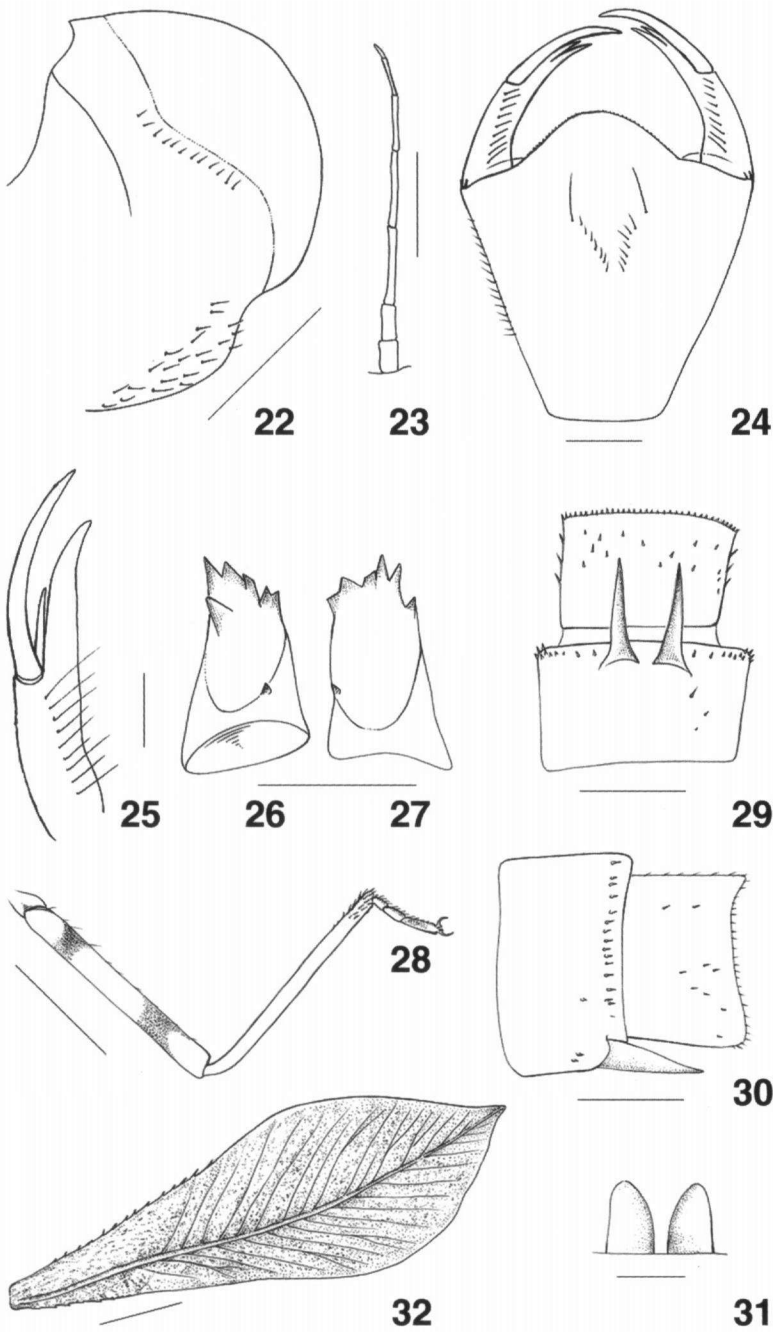
LEPTAGRION CAPIXABAE SANTOS, 1979

Figures 22-32

M a t e r i a l. – Ultimate larval instar: BRAZIL, Espírito Santo, Santa Tereza, 19-VII-1985, (emerged: 17-VII-1985), N.D. Santos leg., 1 ♂.

DESCRIPTION. – Colour pale yellow, except for the dark brown caudal lamellae and labium.

H e a d. – Wider than long, occiput slightly concave; cephalic lobes rounded, with narrow cleft in ventral view; more than 20 short spines on rear of head; 11-12 short spines on inferior border of eyes near maxillae (Fig. 22). Antennae 7-segmented, 3rd segment twice as long as 2nd and as long as 4th (Fig. 23). Labium



longer than in *L. andromache*; prementum triangular with one primary seta and 7-8 secondary setae; ligula slightly prominent, finely crenulated along margin; lateral border of prementum with 15-16 spiniform setae (Fig. 24); labial palp with 9-10 setae (Figs 24-25); anterior border with 2 teeth (Figs 24-25) on distal end, being the external short and thin, proximal to movable hook and the inner wide and pointed, this is black; inferior border of labial palp smooth. Labrum slightly semicircular with short setae on distal margin. Inferior border of articulation of labial palp with prementum bearing 2 spines (Fig. 24). Articulation of pre- and postmentum situated between first pair of coxae. Mandibles (Figs 26-27) with following formula: $L11'234 \text{ y abk/R}11'234 \text{ yk}$.

T h o r a x. – Pronotum subquadrangular; lateral border slightly angulated anteriorly, posterior margin approximately straight, rounded laterally. Legs short, slender and with short spines; femora with two dark bands (Fig. 28); tibiae and tarsi lacking dark bands; claw simple. Wing pads reaching the end of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments with short setae; distal border of segment 10 with row of short spines interrupted dorsally and with some spines laterally. Gonapophyses triangular, smooth (Fig. 29-30) and not denticulate, not reaching the distal margin of segment 10 (Figs 29-30). Cerci long, robust in dorsal view, elongated and blunt (Fig. 31). Caudal lamellae (Fig. 32) dark brown, leaf-shaped, discontinuously pigmented; lateral and dorsal carina of caudal lamellae with short spines on proximal half; distal half wide; principal tracheae almost straight; secondary tracheae thin.

M e a s u r e m e n t s (mm). – Total length: 25; width of head: 2; length of head: 3; length of prementum: 3; width of prementum: 3; antennae segments 1: 0,33, 2: 0,36, 3: 0,83, 4: 0,83, 5: 0,56, 6: 0,36, 7: 0,13; length of median caudal lamella 5,5; width of median caudal lamella: 2; width of lateral caudal lamellae 2; length of lateral caudal lamellae: 6; femur I: 3; femur II: 4; femur III: 5; abdomen: 10.

LEPTAGRION DARDANOI SANTOS, 1968

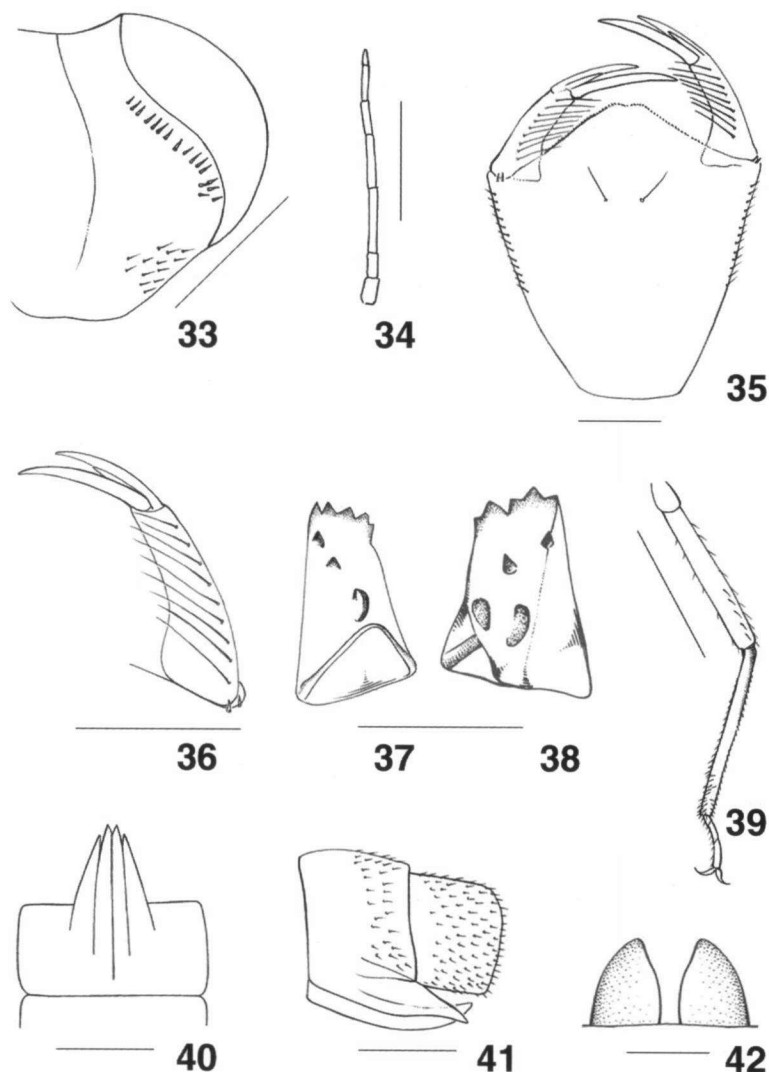
Figures 33-42

M a t e r i a l. – Ultimate larval instar: BRAZIL, Pernambuco, Recife, Parque Zoobotânico Dois Irmãos, 15-IX-1985, (emerged: 15-IX-1985), N.D. Santos leg., 1 ♀.

DESCRIPTION. – Female. Colour light brown except for dark brown caudal lamellae and labium.

Figs 22-32. *Leptagrion capixabae* Santos: (22) head, ventral view; – (23) right antenna; – (24) prementum, dorsal view; – (25) labial palp, dorsolateral view; – (26) right mandible, inner view; – (27) left mandible, inner view; – (28) posterior leg; – (29) male abdominal segment 9-10, ventral view; – (30) male abdominal segment 9-10, lateral view; – (31) male cerci, dorsal view; – (32) lateral caudal lamella.

Head. – Wider than long, occiput concave; cephalic lobes slightly rounded, with narrow cleft in ventral view; less than 15 spines on rear of head; 17-18 short spines (Fig. 33) on inferior border of eyes near maxillae. Antennae 7-segmented, 3rd segment twice as long as 2nd and slightly longer than 4th (Fig. 34); labium short;



Figs 33-42. *Leptagrion dardanoi* Santos: (33) head, ventral view; – (34) right antenna; – (35) prementum, dorsal view; – (36) labial palp, dorsolateral view; – (37) right mandible, inner view; – (38) left mandible, inner view; – (39) posterior leg; – (40) female abdominal segment 9-10, ventral view; – (41) female abdominal segment 9-10, lateral view; – (42) female cerci, dorsal view.

prementum triangular with one primary setae, secondary setae absent; ligula prominent, finely crenulated along margin; lateral border of prementum with 13 spiniform setae (Fig. 35); labial palp with 9 setae (Figs 35-36), anterior border with 2 teeth (Figs 35-36) on distal end, being the external one, proximal to movable hook, short and triangular, and the inner one wide and pointed; inferior border of labial palp smooth. Labrum semicircular with short and little setae on distal margin. Inferior border of articulation of labial palp with prementum bearing 2 spines (Fig. 35-36). Articulation of pre-and postmentum situated between first pair of coxae. Mandibles (Figs 37-38) with following formula: L11'234 y abd R 11'234 y ab.

T h o r a x. – Pronotum semicircular. Legs (Fig. 39) short, slender and with short spines; femora, tibiae and tarsi lacking dark bands; claws simple. Wing pads reaching posterior margin of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments 1-10 with short setae, distal border of segment 10 with a row of short spines interrupted dorsally. Gonapophyses triangular (Figs 40-41) not reaching distal end of segment 10, lateral margin not denticulate. Cerci blunt (Fig. 42). Caudal lamellae lost.

M e a s u r e m e n t s (mm). – Total length: 14; width of head: 3; length of head: 2,5; length of prementum: 4; width of prementum: 3; antennae segments 1: 0,2, 2: 0,17, 3: 0,5, 4: 0,4, 5: 0,25, 6: 0,24, 7: 0,1; length of median caudal lamella 5,5; width of median caudal lamella: 2; width of lateral caudal lamellae 2, length of lateral caudal lamellae 6; femur I: 2; femur II: 3; femur III: 4; abdomen: 10.

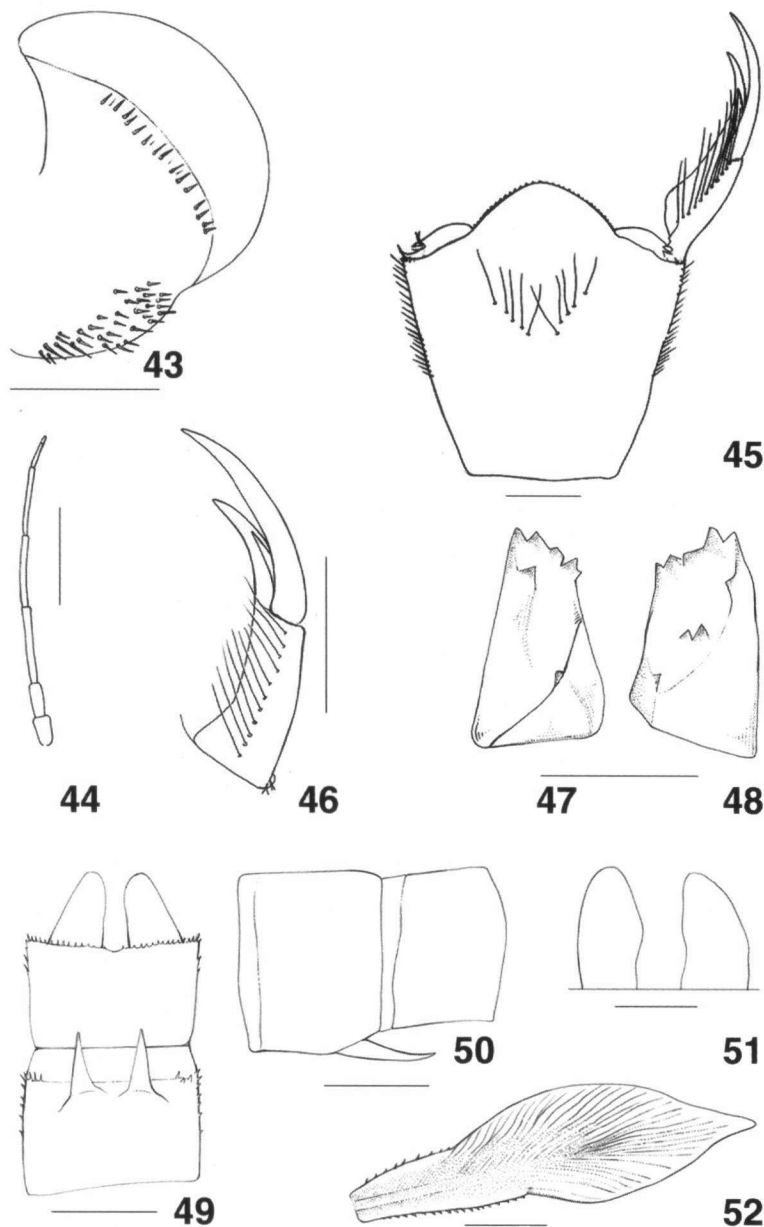
LEPTAGRION ELONGATUM SELYS, 1876

Figures 43-52

M a t e r i a l. – Ultimate larval instar: BRAZIL, Bahia, Olivença, 26-VII-1978, N.D. Santos leg. 1 ♂, (emerged: 4-IX-1978), 1 ♂, (emerged: 1-I-1979). Espírito Santo Santa Cruz, 15-I-1973, N.D. Santos leg., 6 ♂. Rio de Janeiro, Rio de Janeiro, Recreio dos Bandeirantes, Estrada do Pontal, 5-X-1963, N.D. Santos leg., 6 ♂ (3 not emerged); Itacuruçá, Ilha da Marambaia (in Bromeliads: *Neoregelia* sp.), 3-VII-2002, (emerged: 20-VII-2002), J.M. Costa & B.B. Oldrini leg., 1 ♂; Tinguá, 30-I-1974, N.D. Santos leg., 1 ♂; Angra dos Reis, Ilha Grande (Vila do Abraão), 28-II-1986, J.R. Pujol-Luz leg., 1 ♂.

DESCRIPTION. – Colour pale yellow except for black caudal lamellae and movable hook.

H e a d. – Wider than long, occiput concave; cephalic lobes slightly rounded, with narrow cleft in ventral view; more than 30 spines on rear of head; 15-16 short spines (Fig. 43) on inferior border of eyes near maxillae. Antennae 7-segmented, 3rd segment twice as long as 2nd and slightly longer than 4th (Fig. 44). Labium longer than in *L. andromache* and shorter than in other species; prementum short, subtriangular with 5 primary setae, secondary setae absent; ligula slightly prominent, finely crenulated along margin; lateral border of prementum with 20-23 spiniform setae (Fig. 45); labial palp with 10-11 setae (Figs 45-46.), anterior border with 2 teeth on distal end, being the external one, proximal to movable



Figs 43-52. *Leptagrion elongatum* Selys: (43) head, ventral view; – (44) right antenna; – (45) premen-tum, dorsal view; – (46) labial palp, dorsolateral view; – (47) right mandible, inner view; – (48) left mandible, inner view; – (49) male abdominal segment 9-10, ventral view; – (50) male abdominal seg-ment 9-10, lateral view; – (51) male cerci, dorsal view; – (52) lateral caudal lamella.

hook, short and triangular, and the inner one wide and pointed; inferior border of labial palp smooth; labrum semicircular. Inferior border of articulation of labial palp with prementum bearing 3 spines (Fig. 45). Articulation of pre- and postmentum situated between first pair of coxae. Mandibles (Figs 47-48) with following formula: L11'234yabk/R11'234yk.

T h o r a x. – Pronotum semicircular; legs short, slender and with short spines; femora, tibiae and tarsi lacking dark bands; claws simple. Wing pads reaching posterior margin of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments with short setae; distal border of segment 10 with row of short spines interrupted dorsally. Gonapophyses triangular, short (Figs 49-50), not reaching distal margin of segment 10; lateral margin not denticulate. Cerci robust in dorsal view, elongated and blunt with a concavity on internal margin (Figs 49-51). Caudal lamellae (Fig. 52) light brown, foliate, without transverse suture and discontinuously pigmented; lateral and dorsal carina of caudal lamellae with short spines on proximal half; principal tracheae almost straight; secondary tracheae thin.

M e a s u r e m e n t s (mm). – Total length: 20; width of head: 3; length of head: 2,5; length of prementum: 4; width of prementum: 3; antennae segments 1: 0,38, 2: 0,4, 3: 1,0, 4: 0,48, 5: 0,8, 6: 0,38, 7: 0,1; length of median caudal lamella 5,5; width of median caudal lamella: 2,0; width of lateral caudal lamellae 2,0; length of lateral caudal lamellae 6,0; length of lateral caudal lamellae 5,5; femur I: 3; femur II: 4; femur III: 5,0; abdomen: 13.

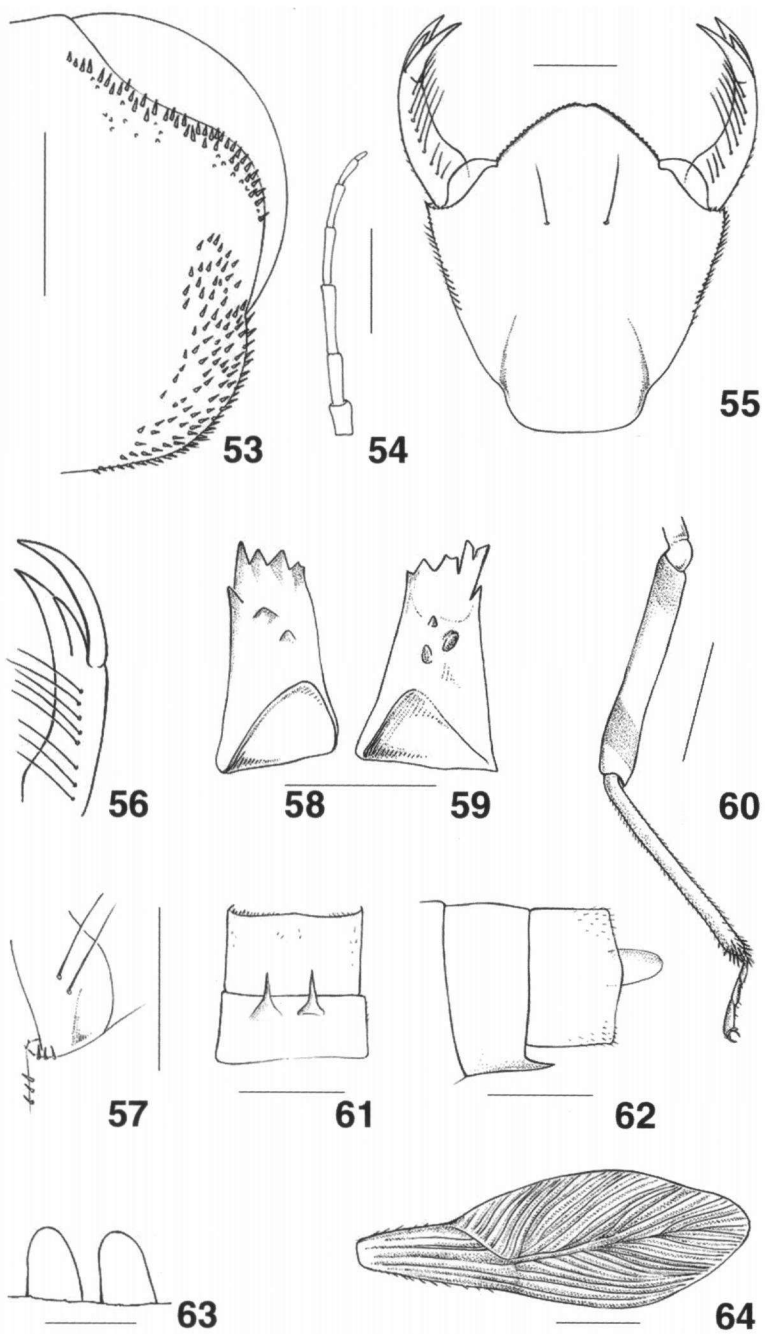
LEPTAGRION MACRURUM (BURMEISTER, 1839)

Figures 53-64

M a t e r i a l. – Ultimate larval instar: BRAZIL, Bahia 1♂: Itabuna (Ihéus), 22-VII-1978, (emerged: 26-VIII-1978), 1♂, (emerged: 1-X-1978), N.D. Santos, J.M. Costa & S.M. Pereira leg., 1♂: 20-VII-1978, (emerged: 19-X-1978); 1♂: Itabuna, 22-VII-1978, (emerged: 19-IX-1978), same collectors. Rio de Janeiro, Rio de Janeiro, 1♂: Represa dos Ciganos (Estrada Grajaú Jacarepaguá), 1963, N.D. Santos leg; 1♂: Tinguá, 11-II-1972, same collector; Petrópolis, 2♂: Vale do Rio Bonfim, 8-IX-1985, (emerged: 24-IX-1985 and 27-IX-1985), N.D. Santos & L.Fernando leg.; 1♂: VIII-1985, (emerged: 8-IX-1985), same collectors.

DESCRIPTION. – Light brown dorsally, except for dark brown labrum and caudal lamellae.

H e a d. – Large and wider than long, occiput concave; cephalic lobes rounded, with narrow cleft in ventral view; more than 70 spines on rear of head; more than 50 spines not aligned (Fig. 53) on inferior border of eyes near maxillae. Antennae 7-segmented, 3rd segment twice as long as 2nd and slightly longer than 4th (Fig. 54). Labium short; prementum short, slightly triangular with one primary setae; ligula strongly prominent and finely crenulate along margin; lateral border of prementum with 15-17 spiniform setae (Fig. 55); labial palp with 8-9 setae (Figs 55-56); anterior border with 2 teeth on distal end, being the external one, proximal to movable hook, short and slightly truncate, and the inner one wide



and pointed; inferior border of labial palp smooth. Labrum semicircular; lateral border of prementum with 17-18 spiniform setae. Inferior border of articulation of labial palp with the prementum bearing 3 spines (Fig. 57). Articulation of pre- and postmentum situated between first pair of coxae. Mandibles (Figs 58-59) with following formula: L 11'22'34y abd, R 11'234y bd.

T h o r a x. – Pronotum semicircular; lateral border slightly angulate anteriorly?; posterior margin slightly straight, rounded laterally. Legs short, slender and with short spines; femora with two dark bands (Fig. 60), not visible in exuvia; tibiae and tarsi lacking dark bands; claws simple. Wing pads reaching posterior margin of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments with short setae; distal border of segment 10 with row of short spines not interrupted dorsally. Gonapophyses triangular, short and smooth (Figs 61-62) not reaching half of length of segment 10; lateral margin not reticulate. Cerci elongated and blunt (Figs 62-63). Caudal lamellae (Fig. 64) dark brown, foliate and discontinuously pigmented; lateral and dorsal carinae without visible spines on proximal half, distal half wide; principal tracheae almost straight; secondary tracheae thin.

M e a s u r e m e n t s (mm). – Total length: 21; width of head: 4; length of head: 3; length of prementum: 4; width of prementum: 3; antennae segments 1: 0,33, 2: 0,5, 3: 0,7, 4: 0,56, 5: 0,46, 6: 0,26, 7: 0,1; width of lateral caudal lamellae: 1,3; length of lateral caudal lamellae: 3; femur I: 3; femur II: 4; femur III: 5; abdomen: 15.

LEPTAGRION PERLONGUM CALVERT, 1909

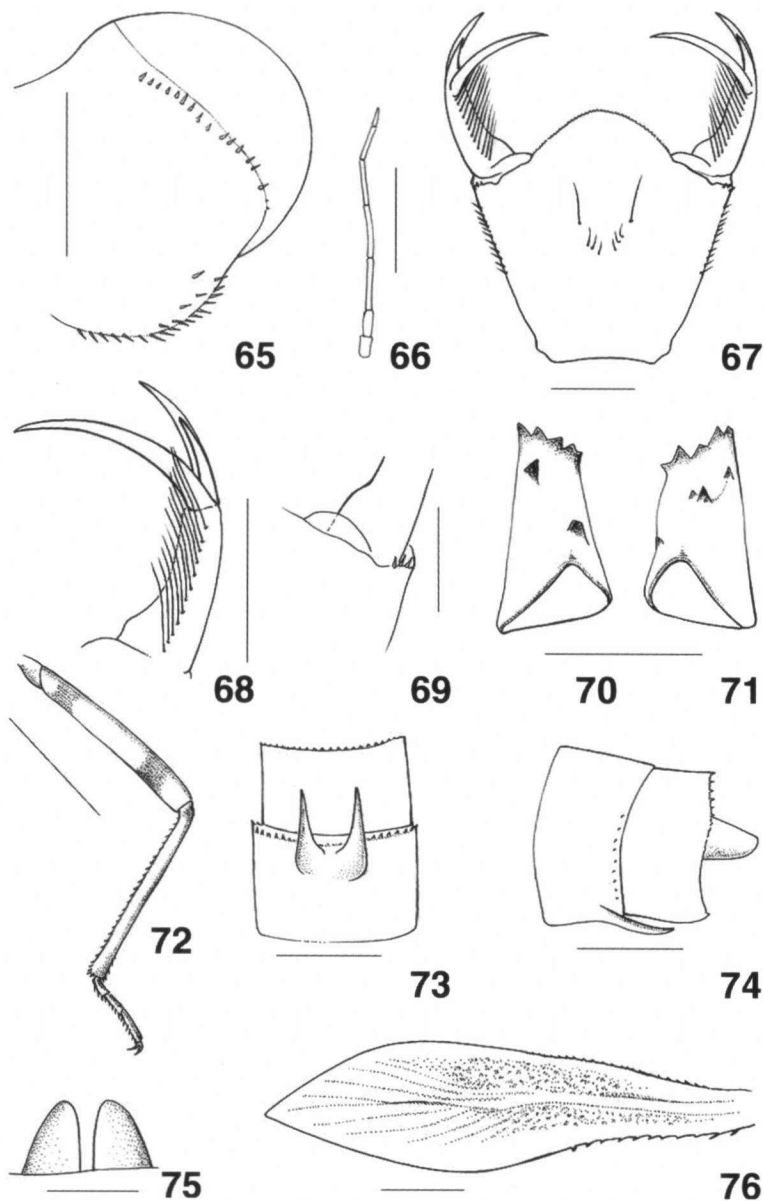
Figures 65-76

M a t e r i a l. – BRAZIL, Rio de Janeiro, Rio de Janeiro, 1♂: Recreio dos Bandeirantes (Pedra de Itaúna), 29-XI-1980, (emerged: 9-XII-1980), N.D. Santos and H. Mesquita leg.

DESCRIPTION. – Overall colour pale yellow.

H e a d. – Wider than long, occiput slightly concave; cephalic lobes rounded, with narrow cleft in ventral view; approximately 20 spines on rear of head; 17 spines (Fig. 65) on inferior border of eyes near maxillae; antennae 7-segmented, 3rd segment 1,5 times as long as 2nd and slightly shorter than 4th (Fig. 66). Labium short; prementum short, approximately triangular, with one primary setae and 3-4 secondary setae; ligula slightly prominent, finely crenulated along margin; lateral border of prementum with 13-15 spiniform setae (Fig. 67); labial palp with 12 setae (Figs 67-68); anterior border with 2 teeth on distal end, being the external

Figs 53-64. *Leptagrion macrurum* Burmeister: (53) head, ventral view; – (54) right antenna; – (55) prementum, dorsal view; – (56) labial palp, dorsolateral view; – (57) setae on articulation of labial palp – (58) right mandible, inner view; – (59) left mandible, inner view; – (60) posterior leg; – (61) male abdominal segment 9-10, ventral view; – (62) male abdominal segment 9-10, lateral view; – (63) male cerci, dorsal view; – (64) lateral caudal lamella.



Figs 65-76. *Leptagrion perlongum* Calvert: (65) head, ventral view; – (66) right antenna; – (67) prementum, dorsal view; – (68) labial palp, dorsolateral view; – (69) setae on articulation of labial palp – (70) right mandible, inner view; – (71) left mandible, inner view; – (72) posterior leg; – (73) male abdominal segment 9-10, ventral view; – (74) male abdominal segment 9-10, lateral view; – (75) male cerci, dorsal view; – (76) lateral caudal lamella.

one, proximal to movable hook, short and triangular, and the inner one wide and pointed (Fig. 68); inferior border of labial palp smooth. Labrum semicircular; inferior border of articulation of labial palp with prementum bearing 3 spines (Fig. 69). Articulation of pre- and postmentum is situated between first pair of coxae. Mandibles (Figs 70-71) with following formula: L11'234yabk/R11'234yd.

T h o r a x. – Pronotum semicircular, lateral border with two black spots on each side. Legs short, slender and with short spines; femora with two dark bands (Fig. 72), not visible in exuvia; tibiae and tarsi lacking dark bands. Wing pads reaching posterior margin of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments 1-10 with short setae; distal border of segment 10 with a row of short spines interrupted dorsally. Gonapophyses triangular, short and smooth (Figs 73-74), not surpassing half length of segment 10. Cerci short and blunt (Figs 74-75), approximately 1/2 of segment 10. Caudal lamellae (Fig. 76) brown, foliate, without transverse suture and discontinuously pigmented; lateral and dorsal carina of caudal lamellae with visible spines on proximal half; distal half pointed; principal tracheae almost straight; secondary tracheae thin.

M e a s u r e m e n t s (mm). – Total length: 21; width of head: 4; length of head: 3; length of prementum: 4; width of prementum: 3; antennae 1: 0,2, 2: 0,26, 3: 0,53, 4: 0,56, 5: 0,46, 6: 0,36, 7: 0,13; width of lateral caudal lamellae: 1,3; length of lateral caudal lamellae: 3; femur I: 2; femur II: 3; femur III: 4; abdomen: 15.

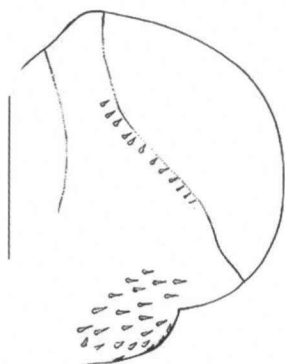
LEPTAGRION VRIESIANUM SANTOS, 1978

Figures 77-88

M a t e r i a l. – BRAZIL, state of Rio de Janeiro, 1♂: Petrópolis, Vale do Rio Bonfim in bromeliads (*Vriesia* sp.), 8-IX-1985, N.D. Santos and L.F.R. Netto leg. (emerged: 3-X-1985); 2♂: 8-IX-1985, same collector.

DESCRIPTION. – Overall colour pale yellow, except for the caudal lamellae, these dark brown.

H e a d. – Wider than long, occiput slightly concave; cephalic lobes rounded, with narrow cleft in ventral view; approximately 25 spines on rear of head; 8 large spines followed by a row of minuscule spines (Fig. 77) on inferior border of eyes near maxillae. Antennae 7-segmented, 3rd segment 1,5 longer than 2nd and slightly longer than 4th (Fig. 78); prementum short, slightly triangular with one primary setae and secondary setae absent; ligula slightly prominent and finely crenulated along margin; lateral border of prementum with 12-13 spiniform setae (Fig. 79); labial palp with 9 setae (Figs 79-80); anterior border with 2 teeth on distal end, being the external short and thin, proximal to movable hook and the inner wide and pointed (Figs 79-80); inferior border of labial palp smooth. Labrum semicircular; inferior border of articulation of labial palp with prementum bearing 3 spines (Fig. 80). Articulation of pre- and postmentum situated between first



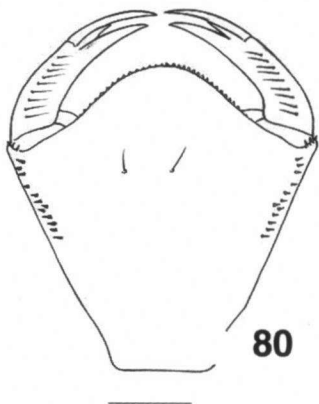
77



78



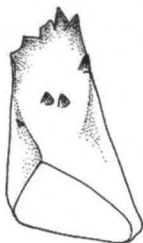
79



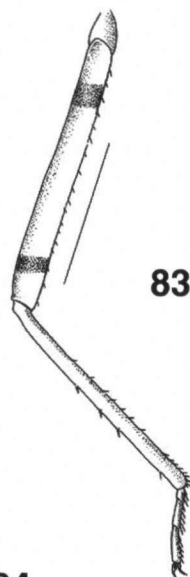
80



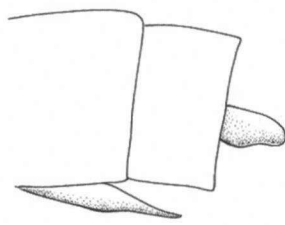
81



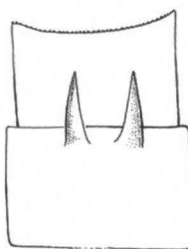
82



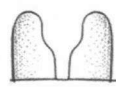
83



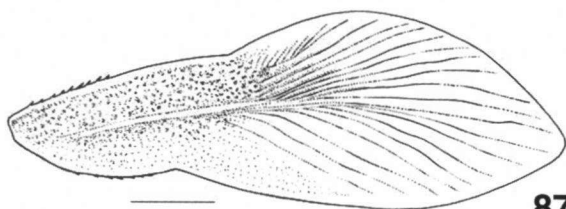
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86



87

pair of coxae. Mandibles (Figs 81-82) with following formula: L11'234yabk R/11'234yk

T h o r a x. – Pronotum semicircular, lateral border with one black spot on each side. Legs short, slender and with short spines; femora with two dark bands (Fig. 83). Wing pads reaching posterior margin of abdominal segment 3.

A b d o m e n. – Cylindrical. Dorsum of segments 7-10 with short setae; distal border of segment 10 with a row of short spines interrupted dorsally. Gonapophyses triangular, short and smooth (Figs 84-85), reaching half the length of segment 10. Cerci in lateral view almost globe-shaped (Figs 85-86), 2/3 of the length of segment 10. Caudal lamellae (Fig. 87) dark brown, foliate, without transverse suture and discontinuously pigmented; lateral and dorsal carina of caudal lamellae with short spines on proximal half; distal half wide; principal tracheae almost straight; secondary tracheae thin.

M e a s u r e m e n t s. – Total length: 22; width of head: 5; length of head: 3; length of prementum: 3; width of prementum: 3; antennae segments 1: 0,32, 2: 0,45, 3: 0,8, 4: 0,62, 5: 0,45, 6: 0,37, 7: 0,2; femur I: 3; femur II: 4; femur III: 5; length of median caudal lamella: 6; width of median caudal lamella: 2; width of lateral caudal lamellae: 2; length of lateral caudal lamellae: 6; abdomen: 14.

DISCUSSION

The presence of larvae of Odonata in phytotelmata was first recorded by KNOB (1913) followed by CALVERT (1910) who reared *Mecistogaster modestus* (Sel.) from bromeliads in Costa Rica. SANTOS (1962) postulated that *Leptagrion* most probably would breed in bromeliads, a fact that was later confirmed (SANTOS, 1966). He suggested that Pseudostigmatidae could be phylogenetically related to coenagrionids because of their breeding habits and possibly convergent morphology of the long abdomen in the bromeliad-breeding coenagrionids like *Leptagrion*. LAESSLE (1961) noted another coenagrionid in phytotelmata, *Diceratobasis macrogaster* (Sel.), whose larva has caudal lamellae of the same type found in *Telebasis* with which it shares other characters of the adult stage, missing the postocular spot, for example. Comparative observations made by DE MARMELS (1985) suggested a parallel evolution of *Diceratobasis* and *Bromeliagrion*. While *Diceratobasis* appears to be a very close relative of *Metaleptobasis* and *Telebasis*, *Leptagrion* shares features with *Aeolagrion*/*Telebasis* and *Mecistogaster*. According to DE MARMELS (1985), *Mecistogaster* retained almost all larval characteristics of *Bromeliagrion*, suggesting a common origin.

Figs 77-87. *Leptagrion vriesianum* Santos: (77) head, ventral view; – (78) right antenna; – (79) prementum, dorsal view; – (80) labial palp, dorsolateral view; – (81) right mandible, inner view; – (82) left mandible, inner view; – (83) posterior leg; – (84) male abdominal segment 9-10, ventral view; – (85) male abdominal segment 9-10, lateral view; – (86) male cerci, dorsal view; – (87) lateral caudal lamella.

Table I
Morphological comparison among the larvae of *Leptagrion* species based on emerged specimens

Characters	<i>L. andromache</i>	<i>L. bocainense</i>	<i>L. capixabae</i>	<i>L. dardanoi</i> (♀)	<i>L. elongatum</i>	<i>L. macrurum</i>	<i>L. perlongum</i>	<i>L. vriesianum</i>
Total length (excluding appendages)	18		25mm	14mm	20mm	21mm	21mm	22mm
Palpal setae	11/12	10/11	9/9	9/9	11/11	8/8	11/11	9/9
Prenatal setae	4/4	2/2	6/6	1/0	1/0	3/3	1/0	7/7
Mandibular formula	01p e03s L 11'234 y ab/ R 11'234 y ab k?	1p e 1s L 11'234 y ab/ R 12344' y abd	01p e05s L 11'234 y ab/ R 11'234 y a'b	1p e 0s L 11'234 y abd/ R 11'234 y ab	1p e 0s L 11'234 y ab k?/R 11'234 y k?	01p e02 L 1233'44' y abd/ R 11'234 y b d	01p e 0s L 11'234 y ab R 11'234 y d	01p e06s L 11'234 yabk? R 11'234 y k?
Setae on articulation of labial palp	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Setae of lateral border of prementum	13/13	17/18	11/11	13/13	14/14	16/16	12/12	13/13
Spines on inferior border of eyes near maxillae	12	33	16	17	14	26	14	07
Spines on rear of head	+20	+30	25	20	24	25	27	31
Ligula	slightly prominent	strongly prominent	slightly prominent	prominent	slightly prominent	strongly prominent	slightly prominent	slightly prominent
Width of head	4	—	2	3	3	4	4	5
Length of head	2,5	—	3	2,5	2,5	3	3	3
Length of prementum	3	—	3	3,6	4	4	4	3
Width of prementum	3	—	3	3,2	3	3	3	3
Length of abdomen	12	—	10	10	13	15	15	14
Length of posterior femur	4	—	5	4	5	5	4	5
Length of lateral caudal lamella	5,6	incomplete	6	6	6	3	3	6
Width of lateral caudal lamella	1,4	incomplete	2	2	2	1,3	1,3	2
Length of median caudal lamella	—	incomplete	5,5	5,5	5,5	—	—	6
Width of median caudal lamella	—	incomplete	2	2	2	—	—	2
Gonapophyses	triangular, not denticulated	triangular, not denticulated, surpassing 1/5 of S-10	triangular, not denticulated, surpassing 1/5 of S-10	triangular, not denticulated, surpassing 1/5 of S-10	triangular, not denticulated, reaching 1/5 of S-10	triangular, not denticulated, reaching 1/5 of S-10	triangular, not denticulated, reaching 1/5 of S-10	triangular, not denticulated, reaching 1/5 of S-10
Cercus	conical	globe-shaped	blunt	blunt	blunt	blunt	blunt	globe-shaped

P = primary; S = secondary; L = left; R = right

The morphology of the eight *Leptagrion* larvae here described is very similar, the differences tenuous, therefore species identification without association with the respective adults is difficult. The presence of setae on the mentum and labial palps in the *Leptagrion* larvae is in marked contrast with the larvae of *Mecistogaster ornata* studied by RAMIREZ (1995) and *Microstigma maculatum* studied by us (unpublished) in which these setae are missing.

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